

CUSTOMER JOURNEY – SMART SOLUTION FOR RAILWAYS

Date	30 - September-2022
Team ID	PNT2022TMID41891
Project Name	Smart Solutions for Railways

Abstract

Technological developments present diverse opportunities to modernise services for the rail industry. Systems can be implemented to improve passengers' experiences, but these may also affect the experiences of crew working on board trains. This first-of-a-kind research extends the concept of customer journey mapping as a design tool to understand the experiences of train crew. To produce these crew journey maps, interviews and user observation methods were adopted ($N = 22$). Results show that two main negative touchpoints for the crew occur at the platform-train interface and during revenue protection activities. This paper presents an innovative methodological contribution around journey mapping to better understand rail experiences, but revolving around the crew rather than the expected consumer experience. We conclude this paper proposing requirements for technological systems and indicate opportunities for the design of systems to generate human-centred improvements for the working practices and experiences of train crew.

1. Introduction

Recent technological developments present opportunities to enhance experiences in public transport not only for passengers but also for staff providing the service. In the UK, the rail industry has been traditionally slow to incorporate innovative technologies. The complexity of the systems that constitutes the railways makes modernisation more difficult (Schmid, 2001; Wilson, 2014), and stakeholders report that the British rail industry lags behind competitors in regards to innovation (Hacktrain, 2016). Studies show that passengers demand more information to be available (Transport Focus, 2014a) and more technologies to be used (Transport Focus, 2014b). It is possible to provide, for example, real-time pre-trip, onboard and post-trip information, and advanced, automated fare collection systems (Camacho et al., 2013; Foth and Schroeter, 2010). There are examples of new

technology being proposed or implemented, such as navigation and wayfinding aids to improve boarding (L. C. Oliveira et al., 2019; Peña Miñano et al., 2017) and advanced onboard information systems for passengers and crew (Rogers et al., 2014).

1.1. Understanding rail experiences

Human factors and ergonomics are often used to understand rail staff activities, the environment they work in and the time pressures they experience (Shepherd and Marshall, 2005). One common observational method is *shadowing*, when the researcher investigates the activities that individuals perform in their real contexts (Hanington and Martin, 2012; Kuniavsky et al., 2012). Shadowing has been used to evaluate the activities performed by train drivers (Naweed et al., 2018) and the ergonomics of their seats and controls (Nathanael and Marmaras, 2018). Interviewing is another method used with train drivers to understand the details of work routines and produce task diagrams (Naweed, 2014) or evaluate the introduction of new technology (Naweed and Rose, 2018).

One common way to visualise UX is through the design of Customer Journey Maps, which are graphical representations of one's encounters with the products, services or systems. These diagrams usually contain different stages of the journey, user actions and emotions (Stickdorn and Schneider, 2010; Williamson, 2016). The map displays the 'touchpoints' between the user and the system, defined as a point in space and time where some sort of interaction took place. In transport studies, journey maps have been used to illustrate the problematic touchpoints for bus (Aceves-González, 2014) and rail passengers (Oliveira et al., 2017; van Hagen and Bron, 2014). However, no studies were found reporting experiences or analysing tasks performed by customer-facing crew.

2. Methodology

Two user studies were designed to answer the research questions proposed above using quantitative and qualitative methods to provide the data required. Two separate methods were used: in-depth semi-structured interviews and shadowing, described below. During the interviews, participants reported significant occurrences and issues during the interaction with the rail system (Stein and Ramaseshan, 2016) and the sequential incidents of the interaction (Jüttner et al., 2013). The shadowing technique and debriefing sessions contributed with details of each activity (Naweed and Rose, 2018; Stanton, 2006) and informed the main touchpoints with the rail system. The user affect at each touchpoint was obtained from the qualitative data analysis and observations. When participants described a task in positive or negative terms, we could infer those as generating the corresponding affects in terms of valence (pleasant/unpleasant) and arousal (activation/deactivation) (Posner et al., 2005; Russell, 1980). Emotions from all participants were averaged and plotted into an experience journey map, similarly to examples in the literature (Aceves-González, 2014; Oliveira et al., 2017; van Hagen and Bron, 2014).

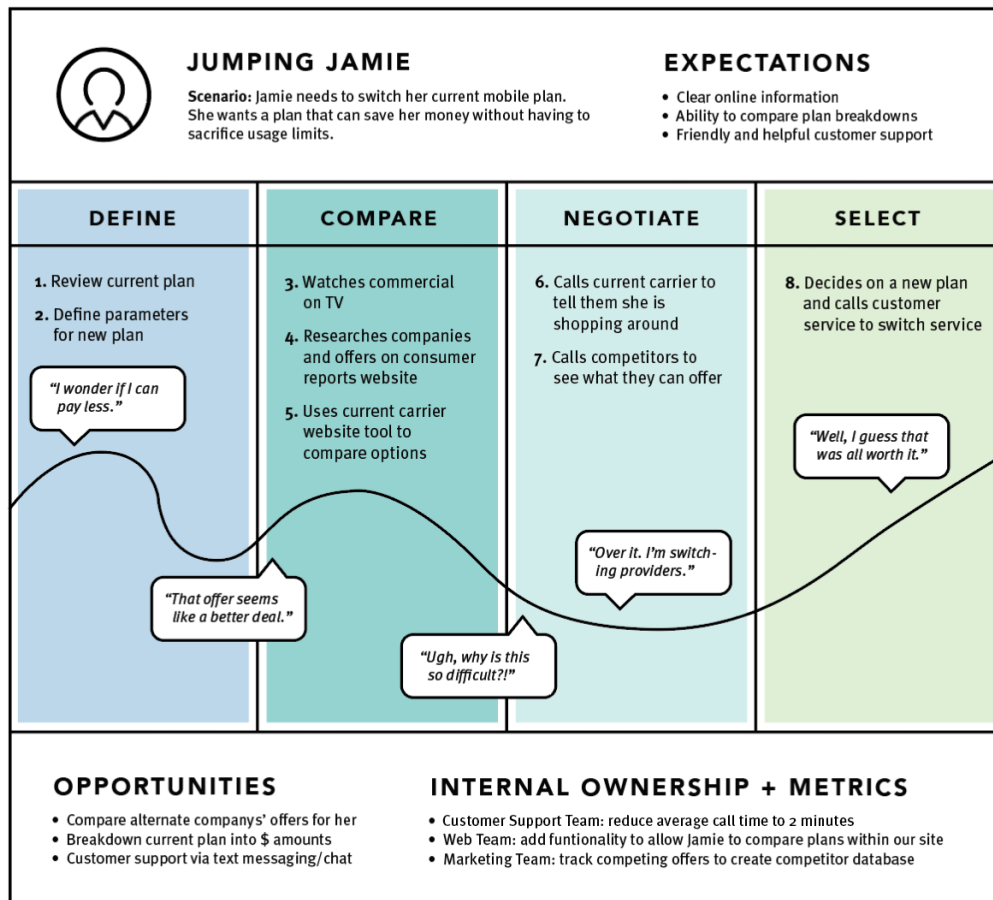
Area	Main question	Sub-questions and prompts
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Setting the scene	What are your daily activities?	Please describe scenarios for these activities
Human interaction	Who do you work with daily to perform your job?	How do you work with them? Do you have to follow any specific rules/training?
Human-computer interaction	Which tools/technology do you use to perform your job (if any)?	How / why do you use them? What works? What doesn't?
Challenges	What are the challenges in performing your daily job?	
Seat reservation	What challenges do you have to deal with around seat reservations?	Are these affected by the type of the service (no. of coaches, size, design of seats, onboard tech?) Nature of the service (direct, slow train?) Time of the day (peak / off-peak?) Seasonal fluctuations (holidays, seasons?) What aspects of the current systems work well? Why? What could be improved? What do you perceive to be the customers' issues with this system? Do you observe different issues for different types of customers?
Ticket validation	What challenges do you have to deal with around checking tickets?	Are these affected by the type of the service (no. of coaches, size, design of seats, onboard tech?) Nature of the service (direct, slow train?) Time of the day (peak / off-peak?) Seasonal fluctuations (holidays, seasons?) What aspects of the current systems work well? Why? What could be improved? What do you perceive to be the customers' issues with this system? Do you observe different issues for different types of customers?
Work experience	What is the part of the work that you enjoy most / least?	Why?
(Show presentation about proposed technology)		
Work fit	How do you think this project might help your daily work?	
Positives and negatives	What do you like about the project? What problems do you see?	How do you see a system like this working in future?
Closing remarks	Is there anything else we should know?	

3. Results

The duration of each activity logged during the shadowing study and the equivalent percentage of time spent on each task. TMs spend most of their time checking tickets (19% of the journey time), followed by the activity of opening and closing doors at each calling point (17%). The door procedure was always coupled with announcements before and after each stop (15%). Customer care took around 14% of their time, in activities on board trains and at platforms, for example giving information, helping passengers with reduced mobility or allowing passengers to store or retrieve their bikes. Additional safety-related activities included dealing with unattended bags and passengers' unsafe behaviours either on board or on platforms.

CUSTOMER JOURNEY MAP *Example (Switching Mobile Plans)*



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Crew journey experience map

The crew journey experience map, which resulted from the studies described here, On the top of the map, there is the definition of who is represented on the map and who contributed to the information there displayed. The second box of text indicates the scenario to be examined, of what kind of experience is plotted. The user goals are indicated on the right-hand side of the map, and this information is linked to the classification of touchpoints at the bottom of the map. In the centre of the map, the list of activities focuses on the work of train managers given that they have to perform a larger number of tasks and interact more with passengers than customer hosts do. The colour bars at the bottom correspond to the main user goals in each stage of the journey. The bottommost row (in blue) indicates the business goal that the map supports, describing that there are opportunities for new technologies to improve experiences at those specific touchpoints.

Activity	Duration (hours:minutes)	%
Checking tickets	05:01	19.31
Door procedure	04:31	17.38
Announcements	03:48	14.62
Customer care	03:38	13.98
Selling tickets	01:39	6.35
Cashing up	01:00	3.85
passenger count	00:31	1.99
Safety issues	00:21	1.35
Maintenance	00:19	1.22
Reservations	00:18	1.15
Other (waiting, walking, breaks, toilet, chatting with colleagues)	04:53	18.79
Total	25:59	100.00

4. Conclusion

This study shed light onto the work performed by onboard crew, indicating how positively or negatively they view it at different points of interaction during train journeys. The crew experience map describes the touchpoints with the rail system and with passengers, highlighting the critical, positive and negative aspects of the journeys. The current research matched this new knowledge with the possibility of introducing new technology to improve crew journey experiences.

The results provide indications of the fit between technology and the work conducted by train managers, and at the same time offer insights into the challenges that changes in these systems may introduce. There is potential for improving work routines, but it is important to analyse each touchpoint with the rail system and the corresponding experiences in detail. Future technology may be able to eliminate some repetitive or unpleasant tasks such as checking valid tickets and minimise risks during boarding and alighting, but should not remove enjoyable parts of current journeys, for example, the interaction with passengers.

